

What is claimed is:

1. A mixture to be employed in conjunction with water for preparing a slurry that hydrates to form an exterior gypsum cement, comprising:

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30 – 70% by weight hydraulic cement;  
30 – 70% by weight calcined gypsum; and  
0.05 – 2.5% polycarboxylate.

2. The gypsum cement mixture of claim 1 wherein said calcined gypsum is alpha-calcined gypsum.

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3. The gypsum cement mixture of claim 1 wherein said composition comprises 35 – 65% hydraulic cement.

4. The gypsum cement mixture of claim 1 wherein said composition comprises 35 – 65% calcined gypsum.

5. The gypsum cement mixture of claim 1 wherein said cement comprises a Type 5 cement.

6. The gypsum cement mixture of claim 1 wherein said composition comprises 0.05 – 1% polycarboxylate.

7. The gypsum cement mixture of claim 1 wherein said polycarboxylate is water-soluble.

8. The gypsum cement mixture of claim 1 wherein said polycarboxylate has a molecular weight range of from about 100,000 to about 5,000,000 Daltons.

9. The gypsum cement mixture of claim 1 wherein said polycarboxylate is based on oxyalkyleneglycol-alkyl ethers and unsaturated dicarboxylic acid derivatives.

10. The gypsum cement mixture of claim 1 wherein said polycarboxylate comprises an acrylic resin latex, modified acrylic polymers, co-polymers of acrylic acid and acrylamide, polymers obtained by grafting polyalkylene oxide on a polycarbonate backbone or poly (methyl vinyl ether/maleic acid).

11. The gypsum cement mixture of claim 1 further comprising at least one of a set accelerating or set retarding additive.

12. The gypsum cement mixture of claim 11 wherein said additive includes at least one of aluminum sulfate, potassium sulfate, acids, proteinaceous retarders and calcium sulfate dihydrate.

13. The gypsum cement mixture of claim 12 wherein said calcium sulfate dihydrate is finely co-ground with a sugar.

14. The gypsum cement mixture of claim 1 wherein when 100 parts of said mixture is mixed with less than 40 parts water to make a slurry, said slurry expands less than 0.01% as it cures.

15. A gypsum cement slurry composition comprising:  
hydraulic cement;  
calcined gypsum;  
polycarboxylate; and,  
5 less than 40 parts water per 100 parts by weight of the  
dry ingredients.

16. The slurry of claim 15 wherein said water  
comprises less than 25 parts per 100 parts by weight of the dry  
ingredients.

17. The slurry of claim 15 wherein said hydraulic  
cement is present in amounts of from 30-70 parts, said calcined  
gypsum is present in amounts of from 30-70 parts and said  
polycarboxylate is present in amounts of from 0.10 to 10 parts per 100  
5 parts by weight of the total solids of the composition.

18. The slurry of claim 15 wherein said  
polycarboxylate is based on oxyalkyleneglycol-alkyl ethers and  
unsaturated dicarboxylic acid derivatives.

19. The slurry of claim 15 wherein said slurry expands  
less than 0.01% as it cures.

20. A method of making a cast article comprising:  
measuring dry ingredients including from about 30 parts  
to about 70 parts calcined gypsum, from about 30 parts to about 70

- 5 parts hydraulic cement, and from about 0.1 to about 10 parts polycarboxylate
- measuring less than 40 parts water per 100 parts by weight of the dry ingredients;
- blending the dry ingredients into the water;
- forming a slurry;
- 10 pouring said slurry into a mold having an appropriate shape to form the cast article;
- allowing said slurry to cure; and
- removing the cast article from the mold.

21. The method of claim 20 further comprising adding a wet aggregate to the slurry prior to said pouring step.